

Application No.: 10/531,353
Docket No.: FA1131USPCT

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REMARKS

Each rejection and objection is addressed under original subject and numeric heading set forth in the Office Action.

Specification Objection

1. The disclosure is objected based on informalities. In response, correction has been made in "Correction to Specification" section of this response.

Claim Rejection – 35 USC §112

3. Claims 4, 15, 16 and 21 are rejected under 35 USC §112. In response, claims are amended accordingly.

Double Patenting Rejection

5. Claims 1-21 are provisionally rejected under 35 USC 101 as claiming the same invention as that of claims 1-21 of co-pending Application No. 10/696,093. In response, the Application No. 10/696,093 has been expressly abandoned.

Claim Rejections – 35 USC §103

7. Claims 1-21 are rejected under 35 USC 103(a) as being unpatentable over Swarup et al (US 5506325)

Swarup et al disclosed a copolymer that "has a weight average molecular weight of around 7,000 to around 18,000, preferably 8,000 to 13,000" (Swarup et al, col. 5, lines 16 – 19). There was no teaching in Swarup et al that a copolymer of molecular weight 13,000 – 18,000 can provide resultant coating with strike-in resistant property. The fact that Swarup et al chose to require additional element, such as "2 to 14 percent by weight of an ethylenically unsaturated oligomeric monomer" indicates that the copolymer of instant invention was not known to those skilled in the art and the use of such copolymer for strike-in resistant coating was not known and was not obvious to those skilled in the art at the time of invention. The acid functional acrylic copolymer of the instant invention has weight average molecular weight more than 15,000, such as Copolymer 1 being 21,499 (Page 17,

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line 1), Copolymer 2 being 15,049 (Page 18, line 5), and Copolymer 3 being 24,601 (Page 19, line 5), all being outside of the preferred range described by Swarup et al. To specifically point out the instant invention, claim 1 has been amended to include molecular weight limitation.

Applicants further point out that although Swarup et al disclosed some elements, such as carboxylic acid group containing monomer, hydroxyl monomer and amorphous silica, that are part of the non-gelled copolymer, said the non-gelled copolymer requires "about 2 to 14 percent by weight of an ethylenically unsaturated oligomeric monomer having a number average molecular weight of about 1500 to about 4000 and which is derived from a hydroxyl functional acid having a predominantly hydrocarbon chain of from about 10 to 19 carbon atoms" (Swarup et al, col. 2, lines 11 – 16). Said "ethylenically unsaturated oligomeric monomer is later reacted with the ethylenically unsaturated monomer to form the copolymer of the present invention" (Swarup et al, col. 4, lines 10 – 13).

The instant invention does not require such oligomer described by Swarup et al. The acid functional acrylic copolymer of the instant invention is polymerized from a monomer mixture of carboxylic acid group containing monomer, functional (meth)acrylate monomer, alkyl (meth)acrylate, and styrene (Page 4, line 35 to Page 6, line 24). The amended claim 1 and a new claim 22 now have a transitional phrase "consisting essentially of" to specifically point out such limitation that the oligomer required by Swarup et al is not required in the instant invention. New claims 23 and 24 are added to include limitations on molecular weight of the copolymer.

As to claim 2, it is now dependent upon the newly amended claim 1. All limitations and specification of claim 1 is therefore incorporated and distinctive from Swarup et al.

As to claims 5-6, they are now dependent upon the newly amended claim 1. All limitations and specification of claim 1 is therefore incorporated and distinctive from Swarup et al.

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As to claim 7, a limitation of molecular weight of 20,000 to 100,000 is included. The amended claim 7 is distinctive from Swarup et al.

As to claim 8, Applicants respectfully point out that Tg of a polymer is mainly determined by molecular composition of that polymer. Here is a quote from a book "The Chemistry of Organic Film Formers", by D.H. Solomon, published by Robert E. Krieger Publishing Company, Huntington, New York: "The Tg of a polymer is related to its chemical composition, molecular weight, and the degree of cross-linking. With increasing molecular weight the Tg increases, but eventually becomes approximately constant over the range used for most practical formulations (page 29)." A Tg of a copolymer can be predicted based on monomer components using Fox equation:

$$1/Tg = W1/Tg1 + W2/Tg2 + W3/Tg3 + W4/Tg4 + \dots$$

Wherein W1, W2, etc are weight fraction of monomer 1, 2, etc, and Tg1, Tg2, etc are Tg of the monomer 1, 2 etc. Since the copolymers of the instant invention is different from that of Swarup et al, Tg is therefore not obvious by Swarup et al. In addition, claim 8 is dependent upon the newly amended claim 1. All limitations and specification of claim 1 is therefore incorporated and distinctive from Swarup et al.

As to claims 9-11, they are now dependent upon the newly amended claim 1. All limitations and specification of claim 1 is therefore incorporated and distinctive from Swarup et al.

As to claims 13-14, amendments have been made to correct typing errors on claim dependency. The amended claims include all limitations and specifications of newly amended claim 1 and therefore are distinctive from Swarup et al.

As to claims 15-16, amendments have been made. The amended claims include all limitations and specifications of newly amended claim 1 and therefore are distinctive from Swarup et al.

As to claim 17, it is now dependent upon the newly amended claim 1. All limitations and specification of claim 1 is therefore incorporated and distinctive from Swarup et al.

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As to claim 18-19, amendments have been made. The amended claims include all limitations and specifications of newly amended claim 1 and therefore are distinctive from Swarup et al.

As to claim 20, it is now dependent upon the newly amended claim 1. All limitations and specification of claim 1 is therefore incorporated and distinctive from Swarup et al.

As to claim 21, it is now dependent upon the newly amended claim 1. All limitations and specification of claim 1 is therefore incorporated and distinctive from Swarup et al. Applicants also respectfully point out that Low VOC solvent based coating composition is distinctively different from water based aqueous coating compositions. The instant invention is directed to a solvent based low VOC coating composition that is distinctively different from water based compositions.

8. Claims 1-21 are rejected under 35 USC 103 (a) as being unpatentable over Barsotti (US 4411951) in view of Swarup et al.

Barsotti disclosed a polymer comprises 0.2% to 1% by weight carboxylic acid group containing monomer (Barsotti, Col. 5, line 68 – Col. 6, line 3). The instant invention claims a copolymer comprising 2% to 12% by weight carboxylic acid group containing monomer. The composition of the instant invention is therefore distinctively different from Barsotti.

As pointed out in the Application, the amount of acid functional acrylic is critical for the desired strike-in resistant property (Page 4, lines 7 – 27). If the amount of acid functional acrylic is too low, the resultant coating will have insignificant strike-in resistant property. If the amount of acid functional acrylic is too high, the resultant coating composition will have higher than desired viscosity. Barsotti disclosed in generally term that acrylic acid could be at a range from 0.1 – 5% (Barsotti, Col. 5, line 63). However, Barsotti chose to use 0.2% - 1% by weight acid monomer and added additional component, such as polyethylene glycol, to achieve desired coating property. This fact indicates that the copolymer of the instant invention was not known to those skilled in the art at the time of invention.

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The strike-in resistant property of the coating resulted from the copolymer of the instant invention was a surprise and was not obvious to those skilled in the art at the time of invention. In conclusion, the use of the acid monomer in the amount of 2% to 12% in the copolymer for achieving strike-in resistant property was a surprise and was not obvious by Barsotti or by Barsotti in view of Swarup et al..

The coating composition of Barsotti requires the polymer to have amides and glycidyl groups, and requires the polyethylene glycol. Barsotti particularly teaches that a paint wherein the polyethylene glycol is omitted had an unacceptable finish showing significant amount of pulling away and sagging (Col. 12, line 7 – 19). The fact that Barsotti selected polyethylene glycol to improve finish property and chose 0.2% to 1% by weight carboxylic acid group containing monomer, clearly demonstrates that those skilled in the art did not anticipate that certain level of carboxylic acid group containing monomer in the polymer can contribute to the desired strike-in resistant property. It further demonstrate that the instant invention was not known to those skilled in the art and was not obvious to those skilled in the art, either by Barsotti alone or by Barsotti in view of Swarup et al.

9. Claims 5-6 are rejected under 35 USC 103(a) as being unpatentable over Swarup et al/Barsotti in view of Swarup et al, further in view of Hazan et al (US 5,244,696).

As stated above, the instant invention was not obvious to those skilled in the art at the time of invention, either by Barsotti alone or by Barsotti in view of Swarup et al. Based on same reasoning, the instant invention was not obvious to those skilled in the art at the time of invention by Swarup et al/Barsotti in view of Swarup et al, further in view of Hazan et al.

Conclusion

Applicants respectfully submit that the claim amendments and the distinguishing observations concerning the references overcome the rejections maintained in the non-final Office Action.

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In view of the foregoing, allowance of the pending claims is respectfully requested.

Respectfully submitted,

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